2nd Annual Symposium
Toward a Global Earth Observation System of Systems
Future National Operational Environmental Satellites

Calibration/Validation of the NPOESS NPP Instruments: Plan Overview

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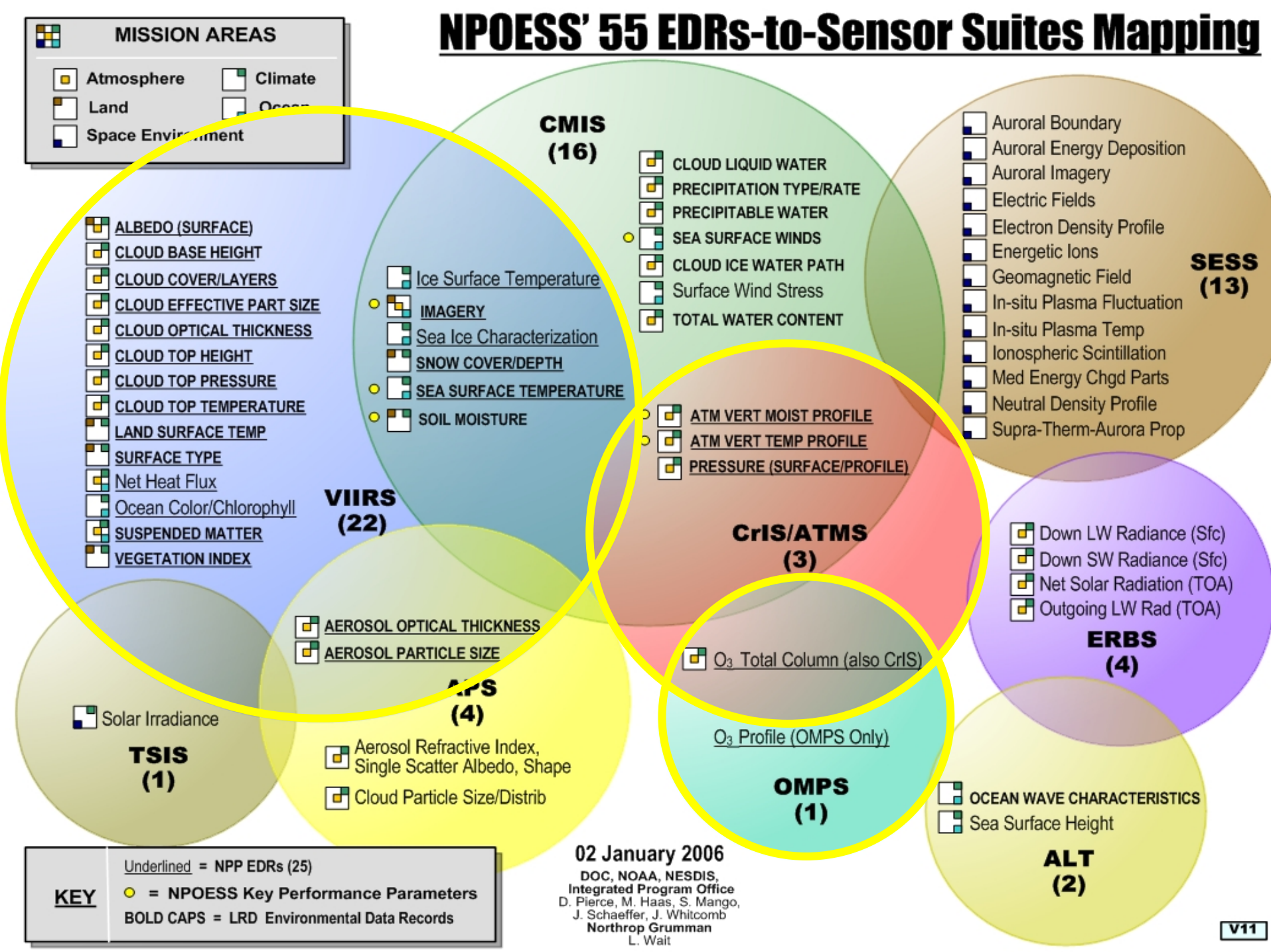
NPOESS Integrated Program Office

NPOESS' 55 EDRs-to-Sensor Suites Mapping

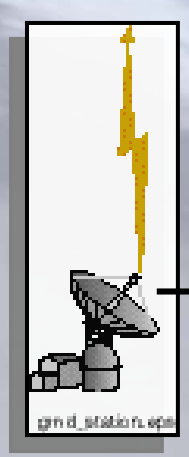


02 January 2006

DOC, NOAA, NESDIS,
Integrated Program Office
D. Pierce, M. Haas, S. Mango,
J. Schaeffer, J. Whitcomb
Northrop Grumman
L. Wait

V11

Philosophy of Calibration/Validation



Cal/Val

Calibration

- Absolute Accuracy
- Polarization Purity
- Geolocation Accuracy
- Instrument Stability
- Signal-to-Noise
- Antenna Pattern Correction

Validation

Environmental Data Products (EDRs)

- Atmosphere
- Ocean
- Land
- Ice
- Space

Ensures

Mission Success

- Meet Specification
- Operational production of synoptic maps and profiles of critical atmospheric, oceanographic, land and space parameters
- Known Accuracy
- Quality Control

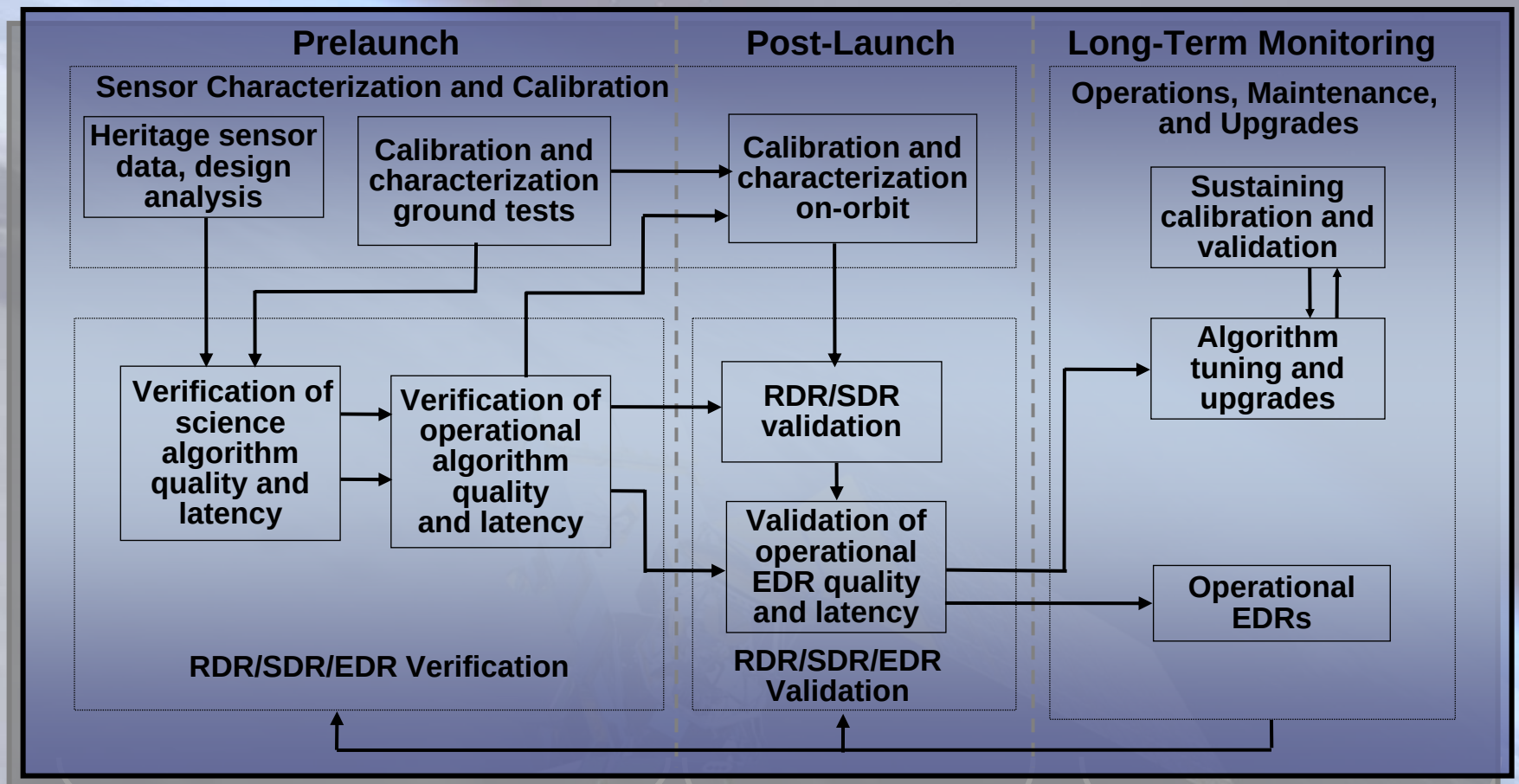
Users

- Centrals
  - NWP
- Real-time tactical
- Non-tactical
  - JTWC
  - NHC
  - JIC
- Science
- Others

Calibration ensures that the Sensor Data (SDRs) are usable
Validation ensures that the Environmental Data (EDRs) are usable

The Stakeholders

NPOESS Calibration Verification Validation Program- System Perspective



Hotbed of Activity

Intensive Planning and Tool Development Effort Underway

Planning Underway

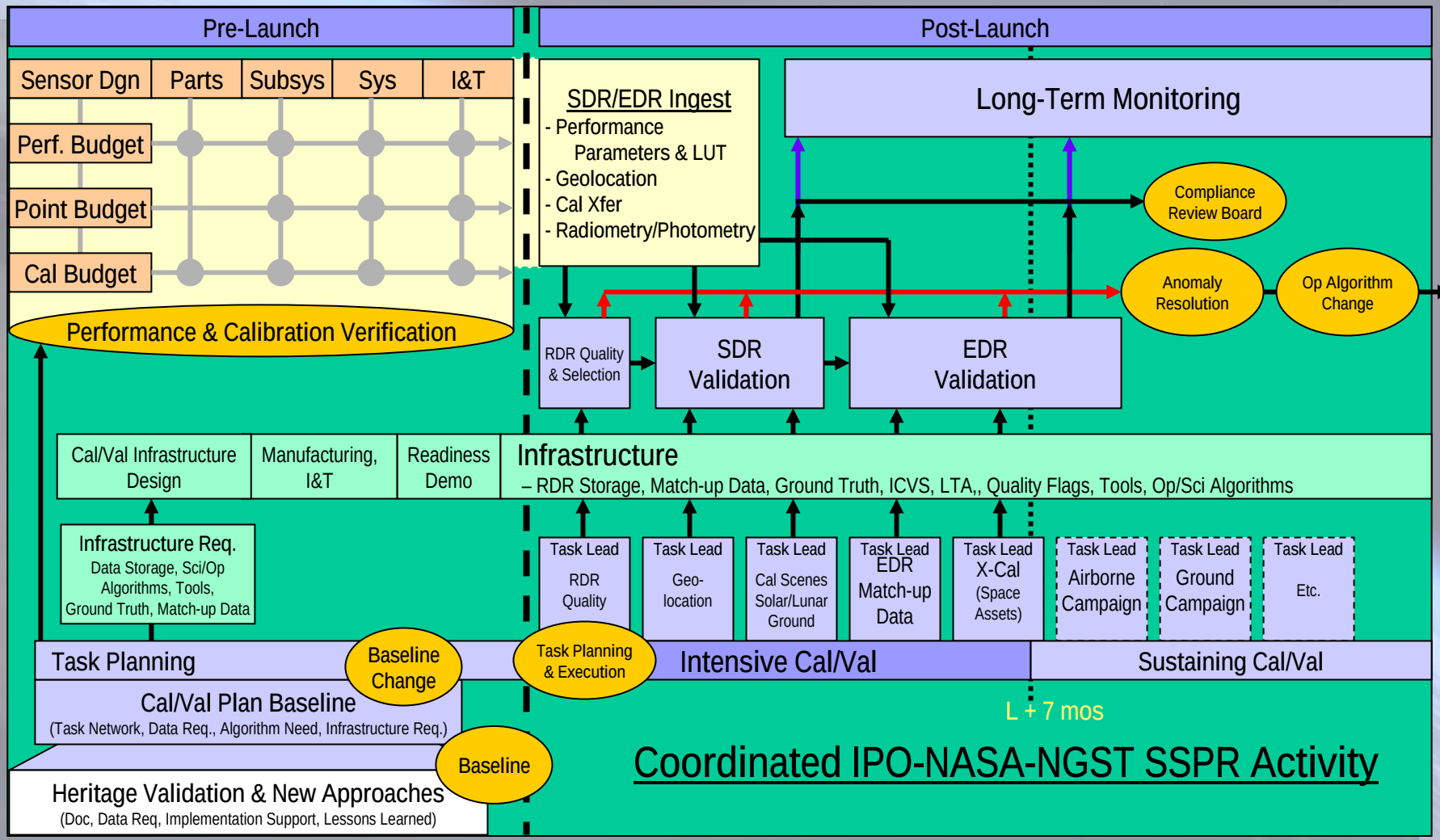
NPP Cal/Val Complexity

- 26 EDRs
- 4 New Instruments
- 3 Resource Management Centers
- Pre-launch tests occurring at 4 different sensor vendors
- How are we managing this?
- How do we know our plans are comprehensive?

Coordinated NPP Cal/Val Plan Baseline and Changes

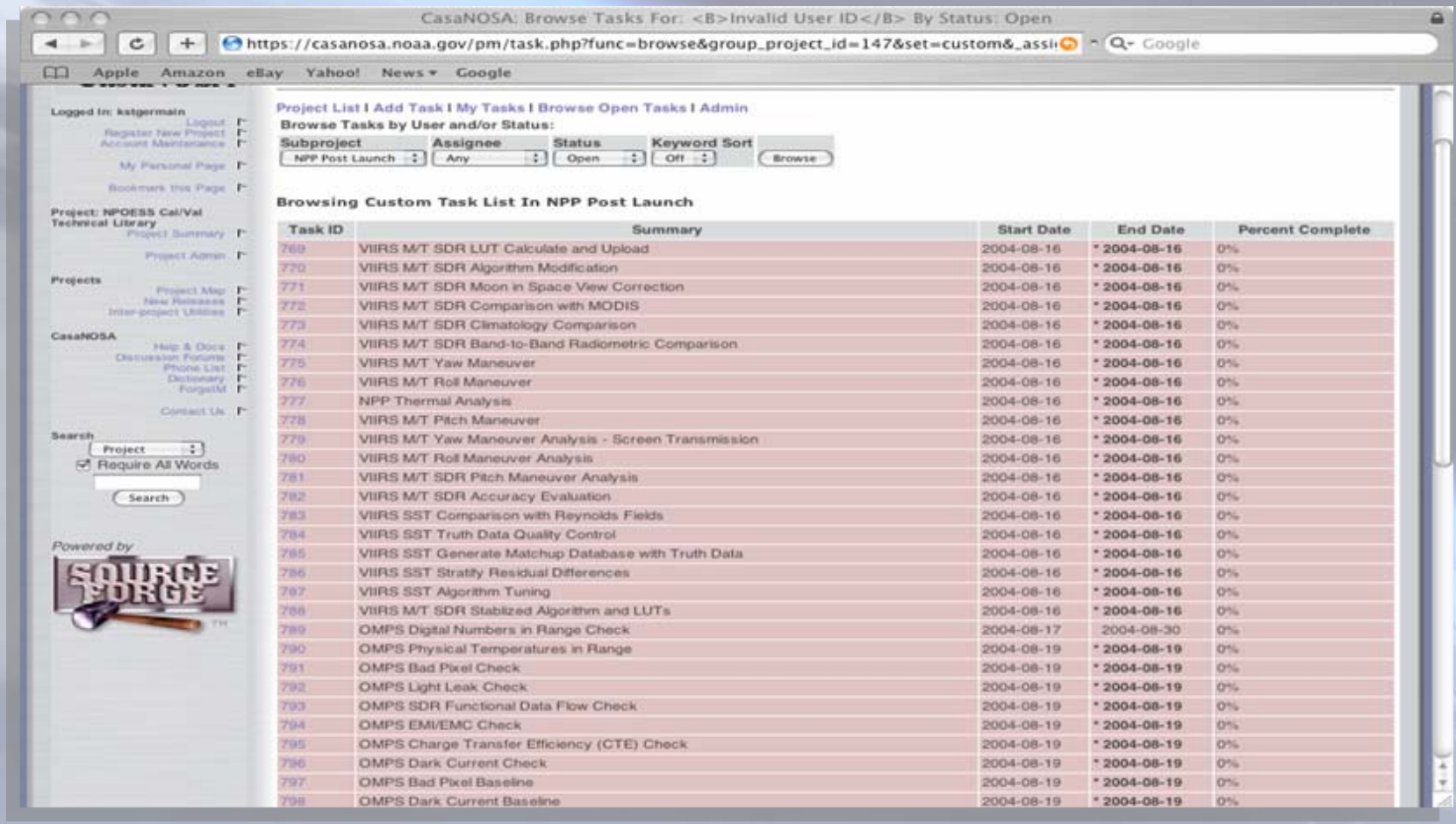
- **Coordinated NPP Cal/Val Plan Baseline**
  - **The SSPR Prime contractor, the Integrated Program Office, and the NAS NPP Science team have a (mostly) common interest in executing a successful Cal/Val**
  - **SDR/EDR Compliance-to-Cal/Val Requirement system engineering (with Science and Technical Advisors involvement) will identify tasks that are must, specific, realistic, and measurable. A Tasks Network will be used to explore schedule constraints and clearly define task responsibilities**
  - **The CVMT and Science/Technical Advisors are responsible for constraint management**
    - **Looking for synergistic tasks. Exploring parallel task execution options**
    - **Identifying discrepancies in bottom-up schedule, budget and Goals**
    - **Using priorities to explore trade-offs**
    - **Using NPOESS SCB and NETS to resolve schedule and budget gaps**
  - **From the Task Network the CVMT will establish roles and responsibilities among performing organizations**
  - **The CVMT will manage execution of the Joint NPP Cal/Val Plan baseline**
- **Joint NPP Cal/Val Plan Baseline changes**
  - **The CVCCB will manage baseline changes employing traditional CCB processes and documentation**

NPOESS NPP Cal/Val "Big Picture"



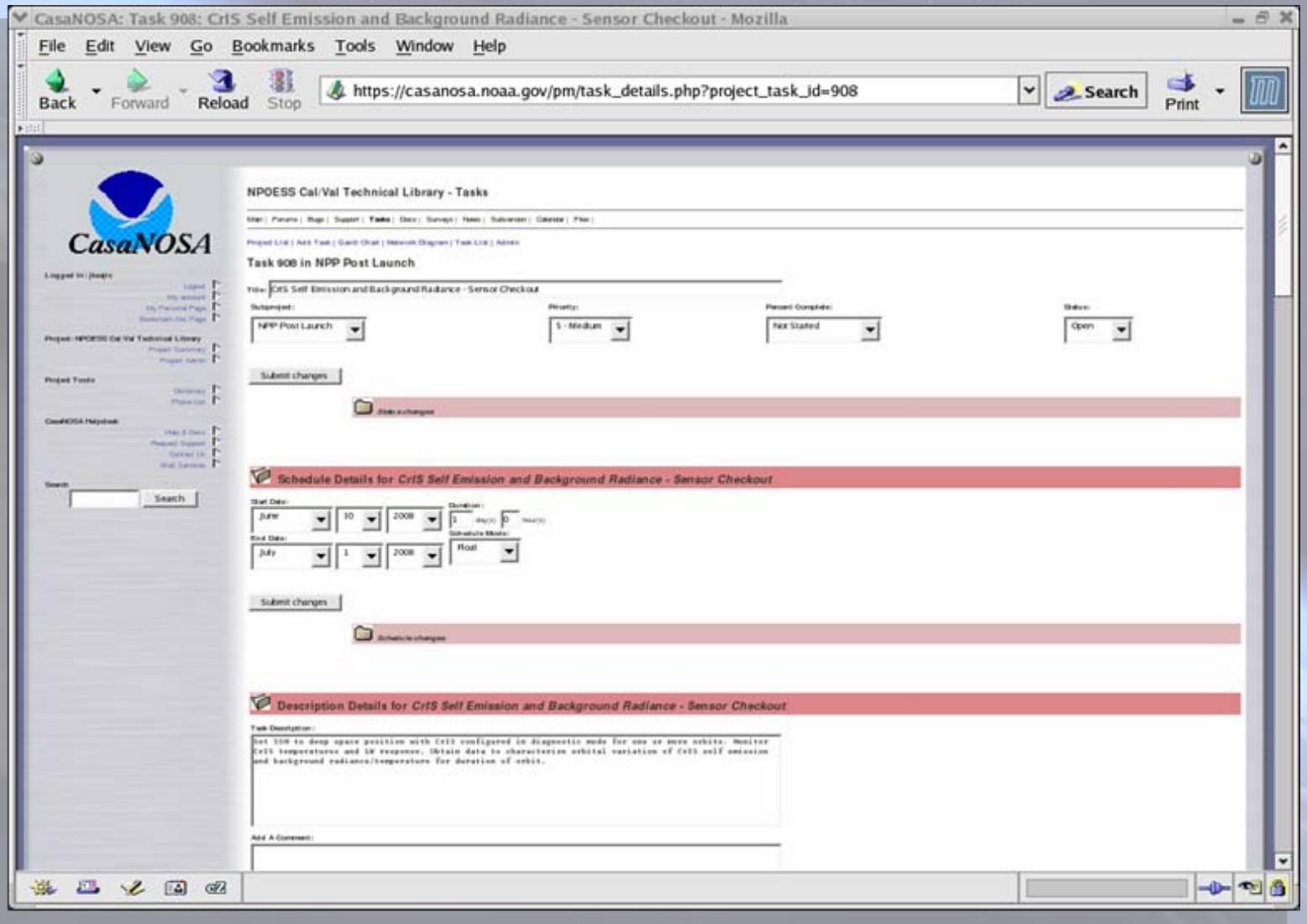
"Bottom Up" approach to defining Cal/Val

Driven by diagnostic work that has to be done in the intensive post-launch phase



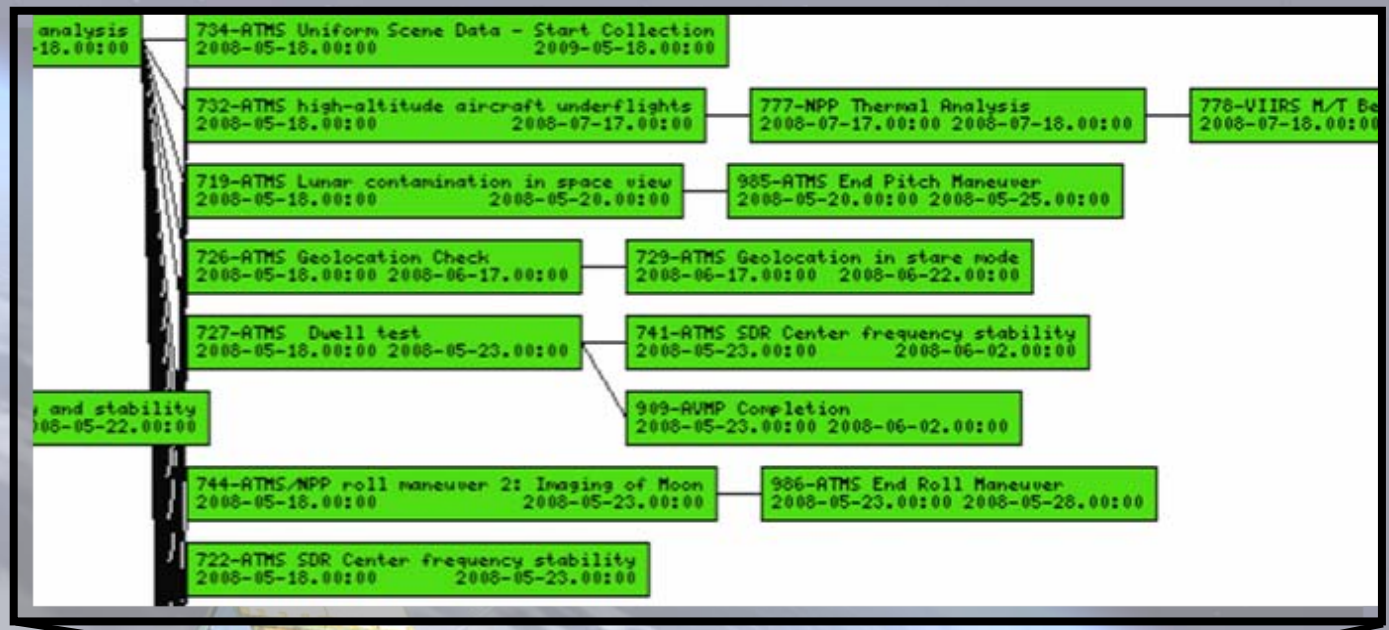
Tasks are captured in a web-based relational database

- *Attributes include Data, metadata, tools, entry and exit criteria, etc.*



Once described, tasks are linked logically and scheduled

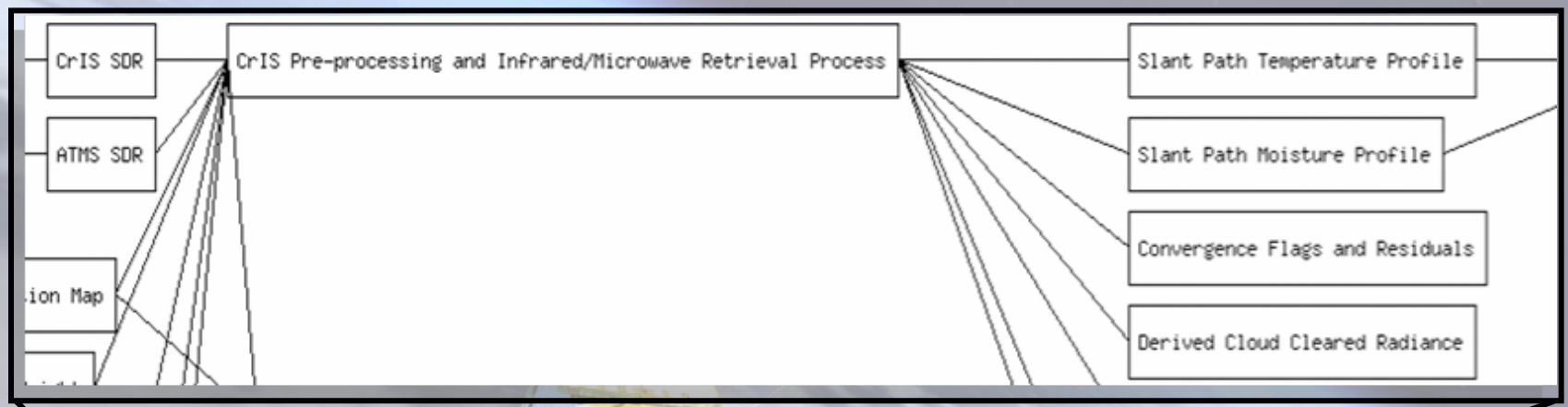
Technical threads are rigorously developed and reviewed by joint teams with individuals from NGST, sensor vendors, Academia, Gov't Labs, and FFRDCs.

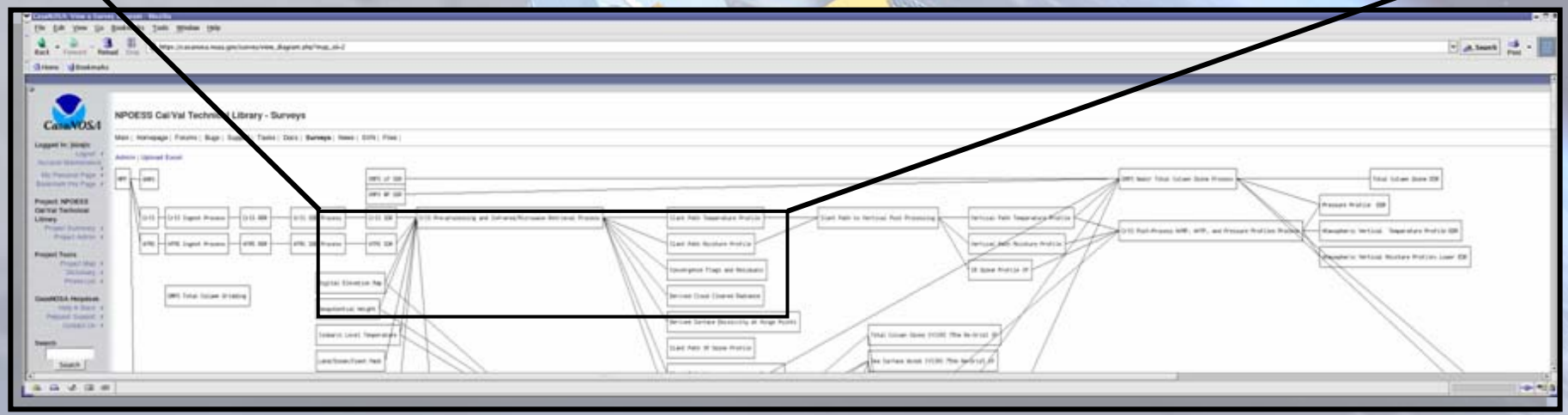


ATMS Thread

A technical library supports the distributed Cal/Val Team

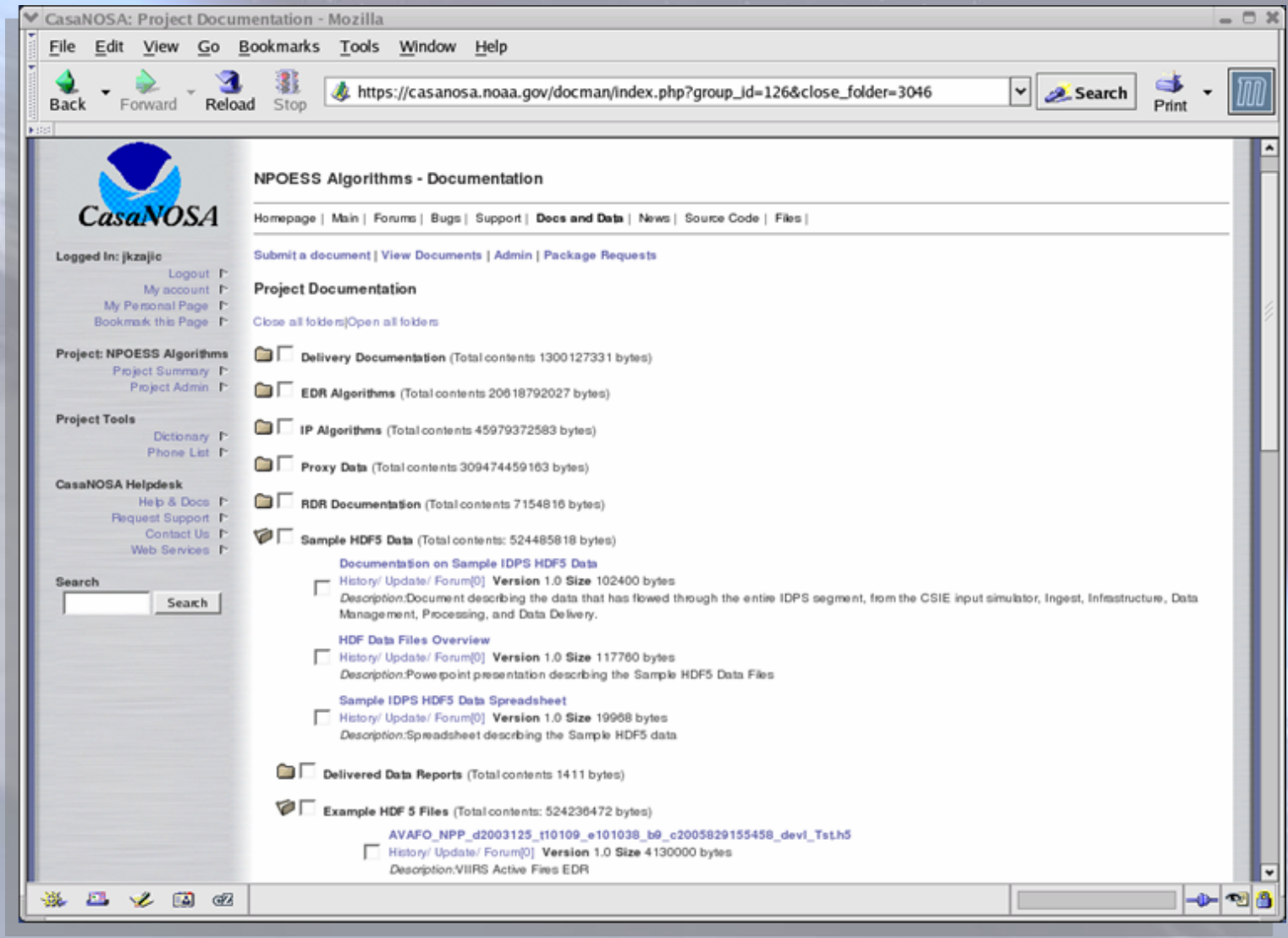
- ***Sensor data, analyses, algorithms, formats, tools, reports***



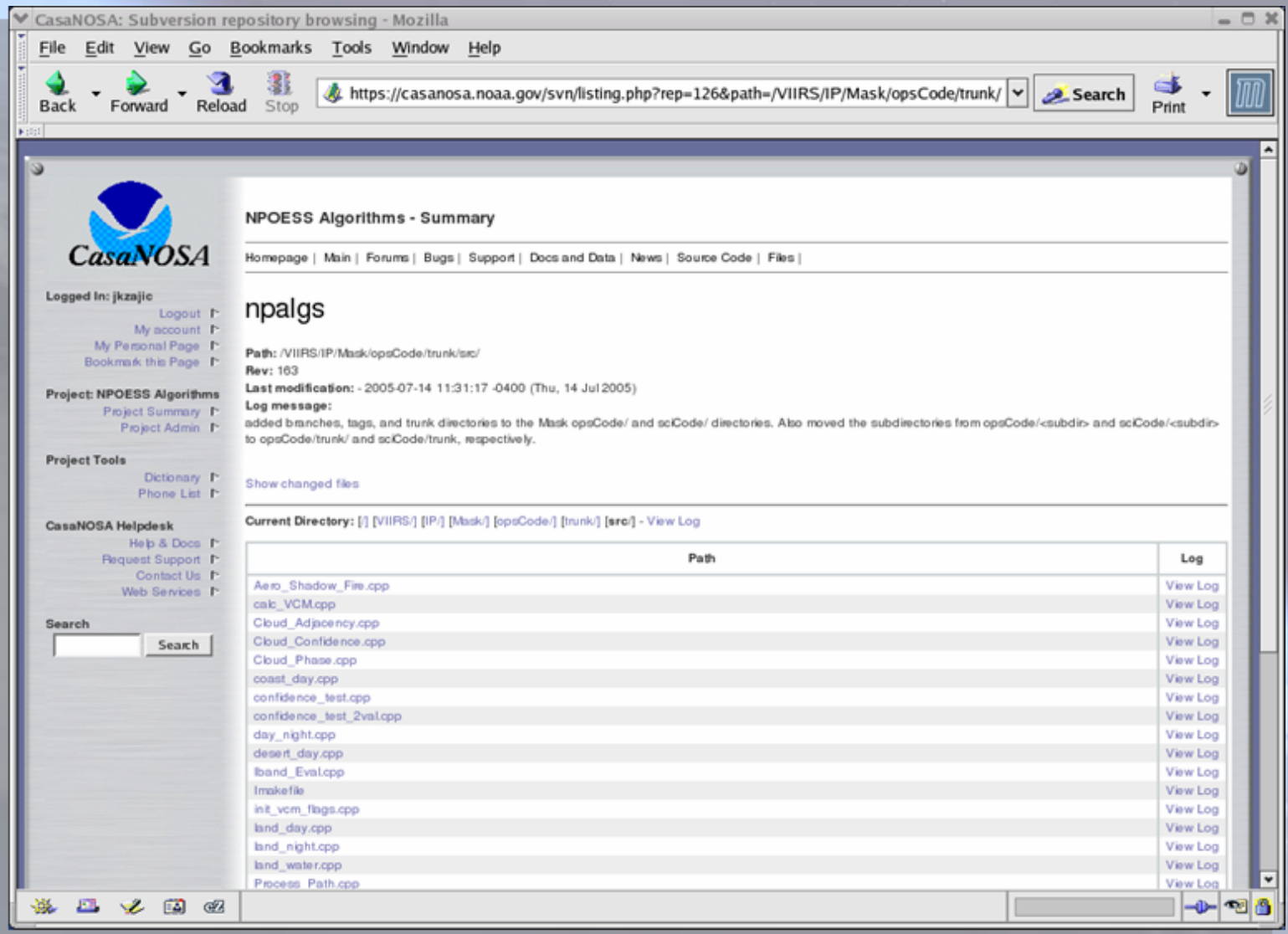


The technical library includes the algorithms and their supporting documentation:

- *ATBDs, code, test data, formats, results, etc.*

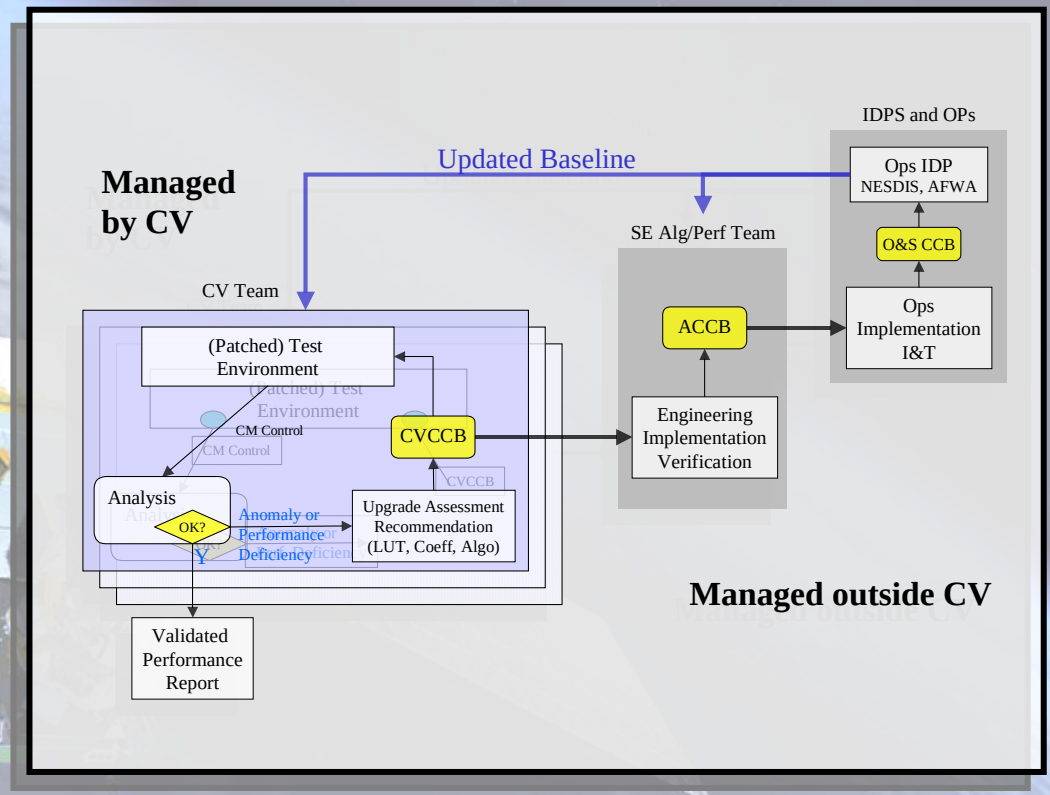


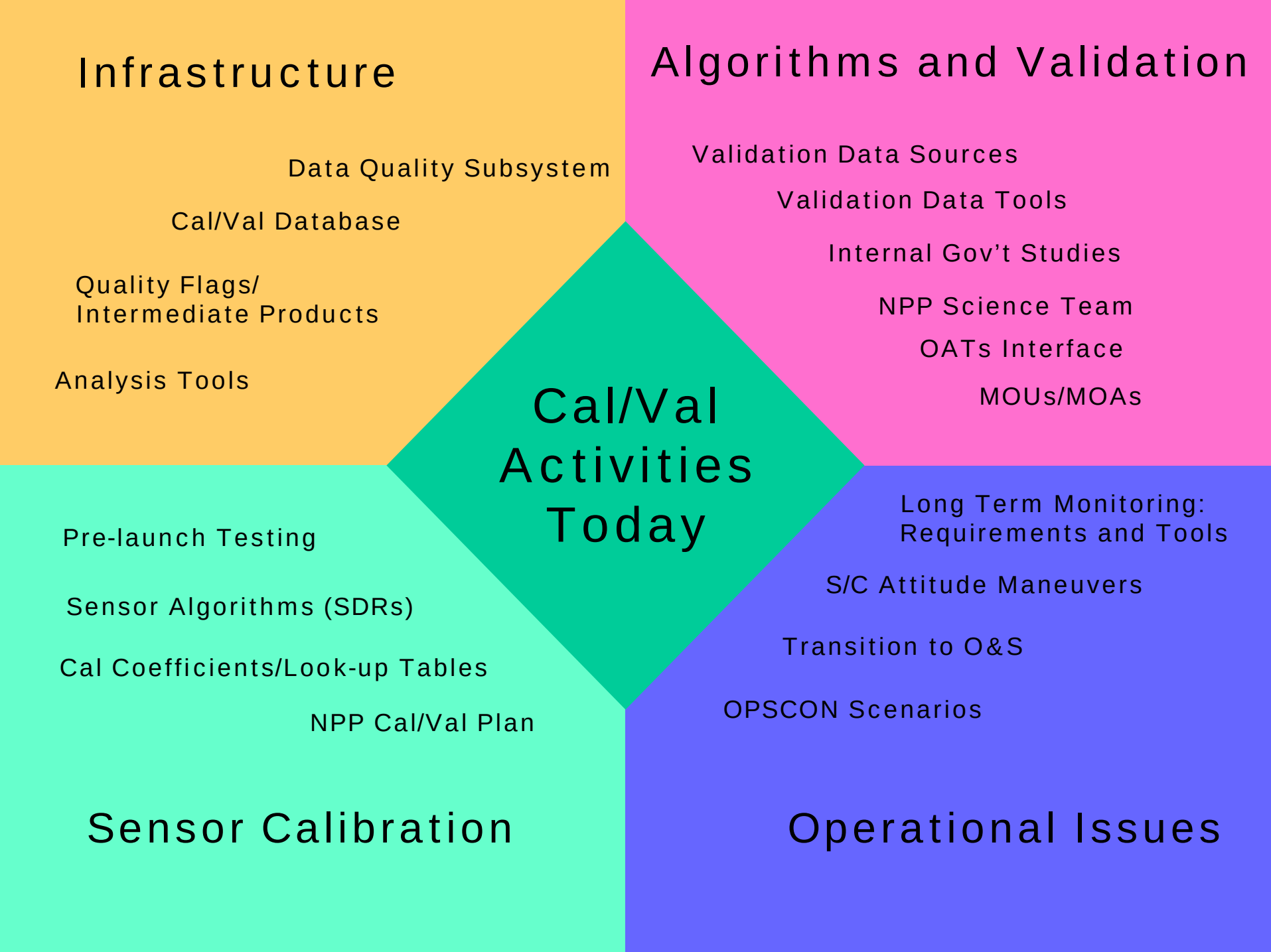
All code, including algorithms and tools is under configuration control for Cal/Val



Cal/Val Anomaly Resolution & Ops Change

- The IPO/NASA/NGST SSPR Cal/Val Team will perform analysis and validation of calibration and SDR/EDR performances
- Cal/Val anomalies will be investigated by expert SSPR CV Anomaly Resolution Teams
- Anomaly findings and resolutions will be submitted to the CVCCB for consideration and subsequent recommendation to the ACCB and the O&S CCB for operational implementation




Infrastructure
Data Quality Subsystem
Cal/Val Database
Quality Flags/
Intermediate Products
Analysis Tools
Algorithms and Validation
Validation Data Sources
Validation Data Tools
Internal Gov't Studies
NPP Science Team
OATs Interface
MOUs/MOAs
Cal/Val
Activities
Today
Pre-launch Testing
Sensor Algorithms (SDRs)
Cal Coefficients/Look-up Tables
NPP Cal/Val Plan
Sensor Calibration
Long Term Monitoring:
Requirements and Tools
S/C Attitude Maneuvers
Transition to O&S
OPSCON Scenarios
Operational Issues

NPOESS Calibration Verification Validation Program Participants

	Exploration & Exploitation Activities	Performance Advisory Activities	Development Activities
IPO & NASA	NPOESS Internal Government Studies NASA NPP Science Team	NPOESS Operational Algorithm Team (NOAT) •Science •Algorithms •Sensors	Integrated Product Teams (IPTs) •Systems Engineering (SE, SI, ST&E) •Payloads •IDPS •Operations and Support IPO Cal/Val Team
NGST		NGST Science Advisory Team (SAT) •Science	Integrated Product Teams (IPTs) •Systems Engineering (SE, SI, ST&E, Cal/Val) •Payloads •IDPS •Operations & Support NGST Cal/Val Team
	NGST SE IPT Science Team		
Joint	NOESS P^{3}I	NPOESS Customer Forum	
	Calibration/Validation Working Group (CVWG) Calibration/Validation Teams (Participation from Gov't Labs, Universities, FFRDCs, Centrals)		

National Polar-orbiting Operational Environmental Satellite System